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# **PROCEEDINGS OF THE EIGHTH ANNUAL WORKSHOP ON SEA TURTLE CONSERVATION AND BIOLOGY**

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# DEBRIS INGESTION BY SEA TURTLES ALONG THE TEXAS COAST

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Sea turtle strandings along the Texas coast are documented by the National Marine Fisheries Service (NMFS) Southeast Fisheries Center's (SEFC) Sea Turtle Stranding and Salvage Network (STSSN). Texas A&M University graduate students are employed by NMFS to survey 295 km of Texas beach from Sabine Pass at the Texas/ Louisiana border south on to Matagorda Island. These STSSN surveys are currently conducted biweekly. Turtles which strand alive are taken to the NMFS Galveston Laboratory for care and rehabilitation. Dead turtles are returned to Texas A&M University at Galveston (TAMUG) for necropsy and food habit analyses.

Necropsies are performed on all turtle carcasses, condition permitting, in an attempt to determine cause of death and gather life history information. The gastrointestinal (GI) tract is removed during necropsy for later food habit analysis. Contents of each GI tract are fixed in formalin, sorted by type and, in the case of natural food items, identified to the lowest possible taxon. Occurrence and total wet weight are recorded for each food item.

Beach debris surveys are conducted in conjunction with stranding surveys to characterize and quantify debris on Texas beaches. Debris was defined as any man-made or processed material (such as lumber). Permanent survey plots were established at randomly selected sites to monitor debris accumulation over time, while replicate survey plots were randomly selected during each survey on respective beaches. All debris was removed from each plot and subsequently identified, counted and weighed. Thirty debris plots were examined in this study.

Two hundred and sixty-nine turtle strandings were documented along the Texas coast during 1 January 1986 - 31 October 1987. One hundred and seventy-three turtles were found in 1986 and ninety-six in 1987. Of the turtles documented, Kemp's ridley sea turtles (*Lepidochelys kempi*) made up 46.5% (125), loggerheads (*Caretta caretta*) accounted for 32.3% (87) and three lesser abundant species (*Dermochelys coriacea*, *Chelonia mydas*, *Eretmochelys imbricata*) along with unidentifiable carcasses comprised the remaining 21.2% (57).

Seventy-three turtles analyzed for food habits included 37 ridleys (50.7%), 34 loggerheads (46.6%) and 2 greens (2.7%). Contents of 49 GI tracts have been completely sorted, with both natural food and debris items identified. The remaining 24 tracts have undergone preliminary analysis to determine only presence and type of man-made debris.

Debris was ingested by 32.9% (24) of all turtles examined. Yearly analysis indicated that 26.8% (11 turtles) and 40.6% (13 turtles) of the 1986 and 1987 stranding stocks, respectively, exhibited

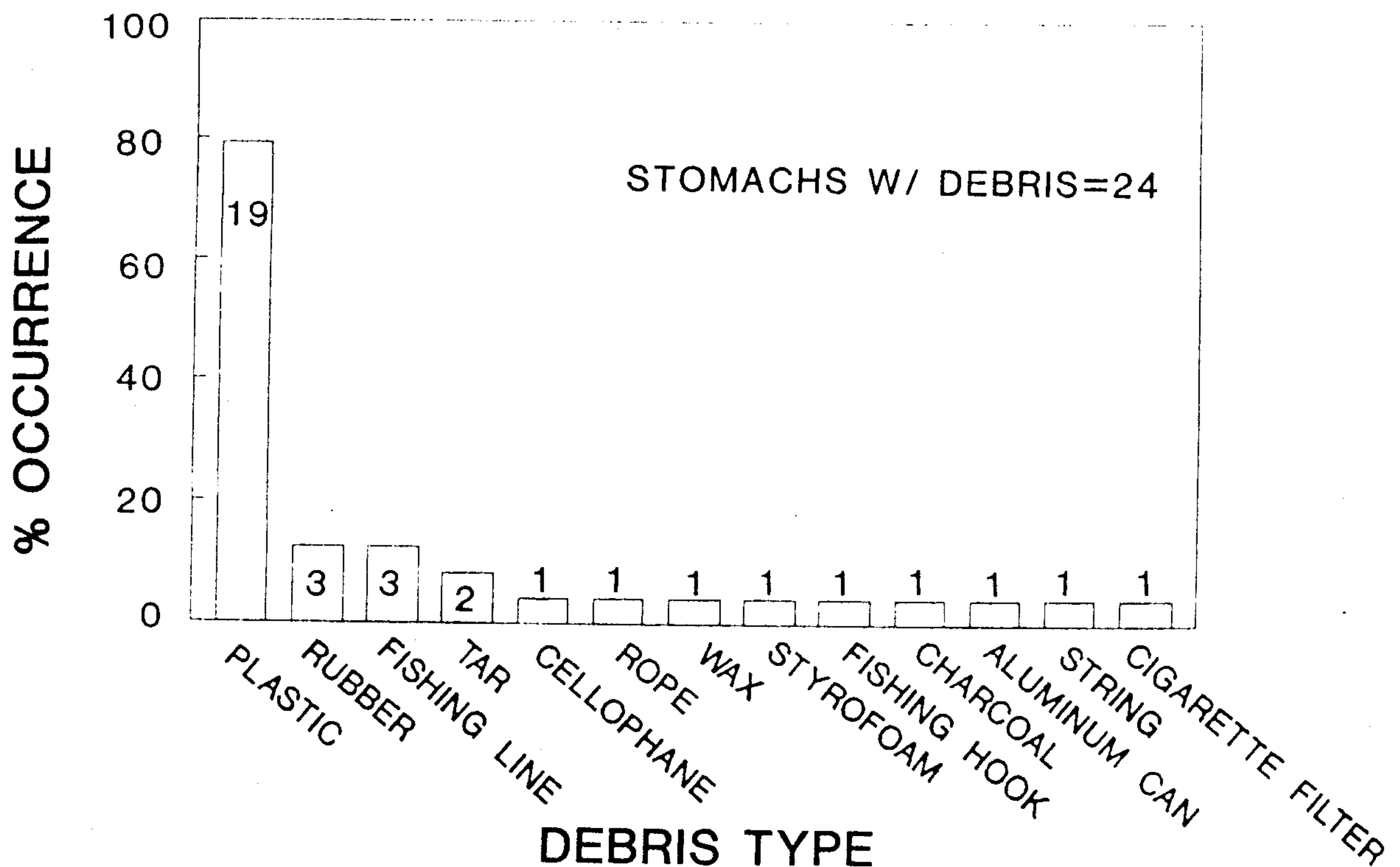


Figure 1. Percent occurrence of debris in all turtles.

debris in their gastrointestinal tracts. Debris ingestion varied by species, with both greens, 41.2% (14) of the loggerheads and 21.1% (8) of the ridleys containing foreign material. Debris was present in 24.0% (6) and 16.7% (2) of the ridleys examined from 1986 and 1987, respectively. Loggerheads ingesting debris increased from 26.7% (4) in 1986 to 52.6% (10) in 1987. Loggerheads' apparent greater susceptibility to debris ingestion could be due to indiscriminate feeding or their inability to distinguish between particular debris items (plastic) and natural foods such as jellyfish (Carr 1987).

Debris ingested by stranded turtles included plastic, rubber, fishing line, tar, cellophane, monofilament rope, wax, styrofoam, a fish hook, charcoal, an aluminum can, string, and a cigarette filter. Items occurring in at least 10% of these turtles (Figure 1) included plastic (79.2%), rubber (12.5%) and fishing line (12.5%). Plastic was the most frequently occurring debris item during both years (72.7% in 1986 and 84.6% in 1987) and among species (ridleys - 75.0%; loggerheads - 78.6%; and greens - 100%).

Beach debris was used as a measure of marine debris since it could be monitored and a major portion of the beach debris represents material that will be incorporated into the marine environment. Major debris categories identified during beach surveys included plastic, tar, glass, styrofoam, rubber, metal, paper, processed wood (lumber), natural debris, and miscellaneous debris. Natural debris includes accumulations of crab, fish or shrimp remains as occurs in shrimp bycatch. Miscellaneous debris was any unidentifiable material or items which could not be placed in an individual category. Plastic and tar were the most frequently encountered debris categories in survey plots, occurring in 29 (96.7%) and 28 (93.3%) of 30 plots, respectively (Figure 2). Other debris categories were observed in 35 to 80% of all survey plots.



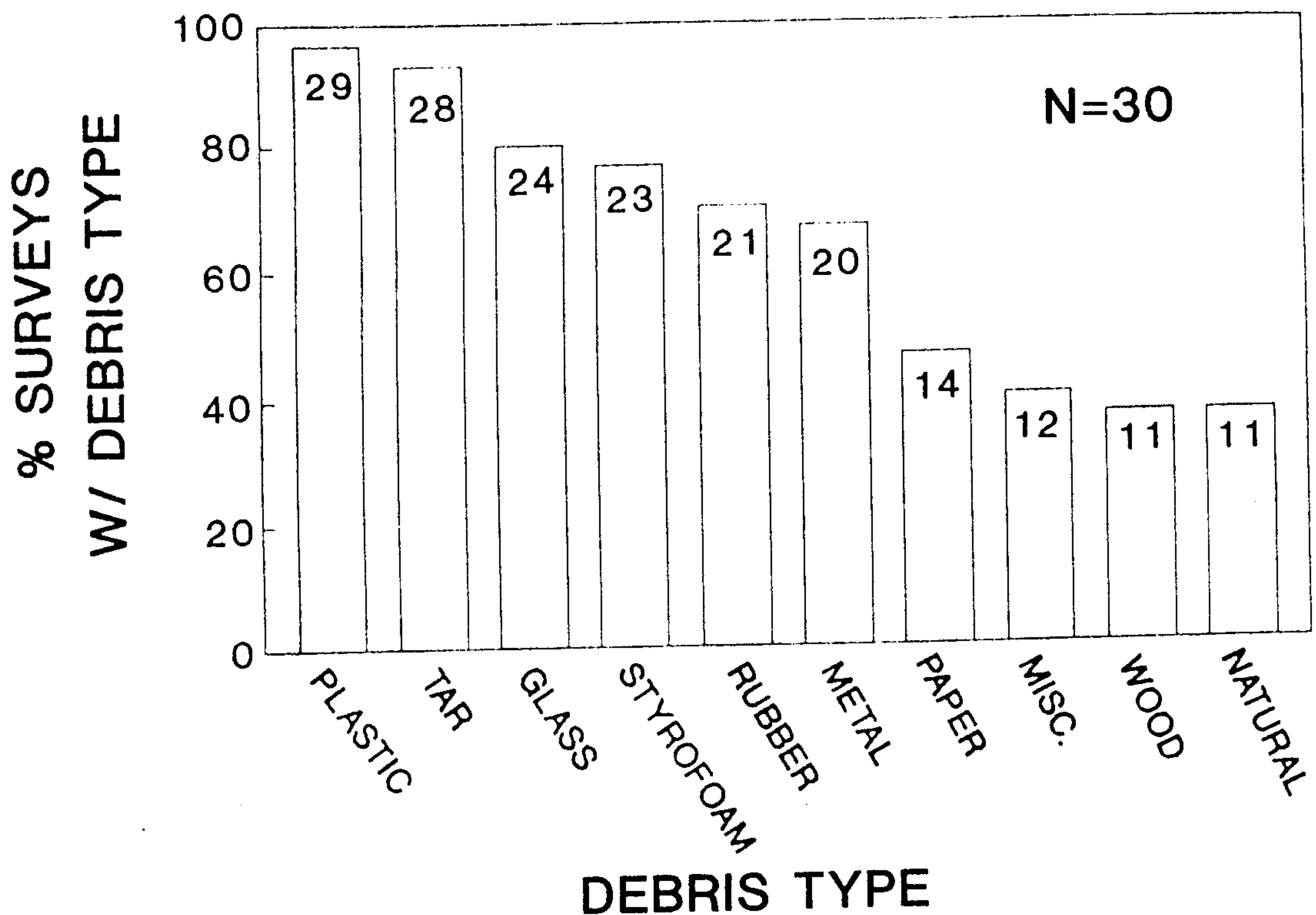


Figure 2. Occurrence of debris in beach plots.

Approximately 85% of the debris categories found in turtles were recorded during beach debris surveys. These categories include plastic, rubber, fishing line, tar, cellophane, mono-filament rope, wax, styrofoam, aluminum cans, string, and cigarette filters. There appears to be a correlation between the percent occurrence of debris in turtles and that on beaches. Plastic exhibited the highest occurrence in stomachs (79.2%) as well as on beaches (96.7%). Tar also occurred frequently on beaches but, due to its negative buoyancy, was less available as a food item and thus seen less frequently in turtles. This indicates an impact by man on sea turtles through the deposition of debris on beaches and in the marine environment.

Seventy-two different natural food items were found in the 49 turtles examined. Natural food items with the highest percent occurrence included saprophytic gastropods (*Nassarius* sp. - 69.4%), bony fish remains (Class Osteichthyes - 61.2%), tube worms (*Diopatra* sp. - 53.1%), blue crabs (*Callinectes* sp. - 44.9%), calico crabs (*Hepatus* sp. - 34.7%), and purse crabs (*Persephona* sp. - 34.7%). Slight variation was seen in frequency of occurrence between years, with the greatest differences exhibited by blue crab, calico crab and tube worm.

Natural food items found in stomachs indicate similar feeding trends for ridleys and loggerheads. Small differences may be due to contrasting abilities of each species to identify and/or capture prey. Differences in feeding trends observed between years are likely due to availability of particular food items (crabs and tube worms) based on conditions occurring each year.

Further research needs to be conducted concerning the ingestion of debris by sea turtles and man's impact on these endangered species.

#### LITERATURE CITED

Carr, A. 1987. Impact of nondegradable marine debris on the ecology and survival outlook of sea turtles. *Marine Pollution Bulletin* 18:352-356.